WHAT IS CLAIMED IS:

1. A method for recovering acid from a feed mixture comprising acid, hydrocarbons and water, the method comprising:

processing said mixture using a first polymeric membrane to form a first retentate containing a substantially greater concentration of hydrocarbons than said feed mixture and a first permeate containing a substantially greater concentration of acid and water than said feed mixture, said first polymeric membrane being selectively permeable to the acid and water over the hydrocarbons in the feed mixture

2. The method of claim 1 wherein said first polymeric membrane is selected from the groups of:

(a) PVA;

(b) crosslinked PVA;

(c) PVS;

(d) crosslinked PVS; or

(e) a combination of (a) through (d).

3. The method of claim 1 wherein said feed mixture contains from about 70 to about 98 percent by weight sulfuric acid strength acid.

4. The method of claim 1 wherein said feed mixture contains from about 70 to about 98 wt% sulfuric acid, from about 1 to about 20 wt% hydrocarbons, and from about 0.5 to about 7 wt% water.

5. The method of claim 1 wherein said first retentate contains a concentration of hydrocarbons of at least about 3 wt% greater than said feed

mixture, and said first permeate contains a concentration of acid and water of at least about 1 wt% greater than said feed mixture.

6. The method of claim 1 wherein said first retentate contains a concentration of hydrocarbons of at least about 10 wt% greater than said feed mixture, and said first permeate contains a concentration of acid and water of at least about 3 wt% greater than said feed mixture.

7. The method of claim 1 wherein said first retentate contains a concentration of hydrocarbons of at least about 18 wt% greater than said feed mixture, and said first permeate contains a concentration of acid and water of at least about 6 wt% than said feed mixture.

8. The method of claim 1 wherein said acid is sulfuric acid.

9. The method of claim 1 wherein said feed comprises:

(a) acid, ranging from about 80 wt% to about 98 wt%;

(b) water, ranging from about 0.5 wt% to about 5 wt%; or

(c) hydrocarbons, ranging from about 1 wt% to about 15 wt%.

10. A method for recovering acid from a feed mixture comprising acid, hydrocarbons and water, the method comprising:

processing said mixture using a first polymeric membrane to form a first retentate containing a substantially greater concentration of hydrocarbons than said feed mixture and a first permeate containing a substantially greater

concentration of acid and water than said feed mixture, said first polymeric membrane being selectively permeable to the acid and water over the hydrocarbons found in the feed mixture;

processing said first permeate using a second water reduction means to form a first stream containing a substantially greater concentration of acid than said first permeate and a second stream containing a substantially greater concentration of water than said first permeate; and

recovering said first stream.

11. The method of claim 10 wherein second water reduction means is a polymeric membrane and said first and second polymeric membranes are selected from the group consisting of perfluorinated ionomer membranes, sulfonated perfluorinated membranes, and polyethylene polyvinylidenefluoride membranes, oxoanion modified PVA, and crosslinked oxoanion modified PVA.

12. The method of claim 11 wherein said first and second polymeric membranes are selected from the group consisting of PVA, PVS, crosslinked PVA, crosslinked PVS, polytetrafluoroethylene and Nafion®.

13. The method of claim 11 wherein said first polymeric membrane is crosslinked PVS and said second polymeric membrane is Nafion®.

14. The method of claim 10 wherein said feed mixture contains from about 80 to about 98 percent by weight sulfuric acid strength acid.

15. The method of claim 10 wherein said second retentate contains from about 70 to about 99.5 percent by weight acid.

16. The method of claim 10 wherein said second retentate is of sufficient acid strength to be used as a makeup catalyst in an alkylation process.

17. The method of claim 10 wherein said mixture comprises spent sulfuric acid from an alkylation process, and said second retentate is recycled to the alkylation process.

18. The method of claim 10 wherein said feed mixture contains from about 80 to about 98 wt% sulfuric acid, from about 1 to about 20 wt% hydrocarbons, and from about 0.5 to about 7 wt% water.

19. The method of claim 10 wherein said first retentate contains a concentration of hydrocarbons of at least about 3 wt% greater than said feed mixture, and said first permeate contains a concentration of acid and water of at least about 1 wt% greater than said feed mixture.

20. The method of claim 10 wherein said first retentate contains a concentration of hydrocarbons of at least about 10 wt% greater than said feed mixture, and said first permeate contains a concentration of acid and water of at least about 3 wt% greater than said feed mixture.

21. The method of claim 10 wherein said first retentate contains a concentration of hydrocarbons of at least about 18 wt% greater than said feed mixture, and said first permeate contains a concentration of acid and water of at least about 6 wt% than said feed mixture.

22. The method of claim 11 wherein said second retentate contains a concentration of acid at least 1 wt% greater than said first permeate, and said

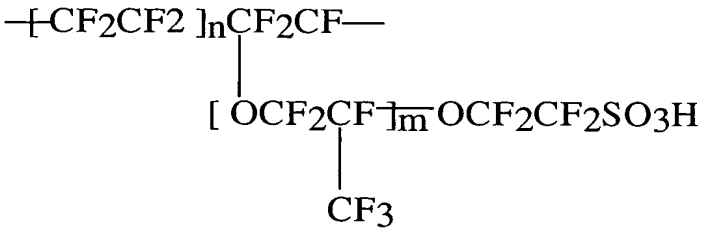
second permeate contains a concentration of water at least 3 wt% greater than said first permeate.

23. The method of claim 11 wherein said second retentate contains a concentration of acid at least 3 wt% greater than said first permeate, and said second permeate contains a concentration of water at least 10 wt% greater than said first permeate.

24. The method of claim 11 wherein said second retentate contains a concentration of acid at least 6 wt% greater than said first permeate, and said second permeate contains a concentration of water at least 18 wt% greater than said first permeate.

25. The method of claim 11 wherein at least one of said membranes comprises a copolymer of perfluoroethylene and perfluorovinylether, wherein the perfluorovinylether moiety bears pendant carboxylic acid or sulfonic acid groups.

26. The method of claim 11 wherein at least one of said membranes comprises the following copolymer:



where m = 5 to 13.5; and n = 1,000.

27. The method of claim 10 wherein said acid is sulfuric acid.

28. The method of claim 10 wherein said second water reduction means include vacuum evaporation.

29. The method of claim 10 wherein said second water reduction means includes adding a sufficient amount of acid anhydride.

30. The method of claim 29 wherein said acid anhydride is SO_3, or oleum, added in an amount sufficient to reduce water content and increase sulfuric acid content for hydrocarbon alkylation.

31. A polymeric membrane for separating hydrocarbons from a spent sulfuric acid mixture comprising sulfuric acid, hydrocarbons and water, said polymeric membrane comprising:

a porous support; and

a thin polymeric selective layer securely attached on top of said porous support;

wherein said polymeric membrane allows preferential permeation of sulfuric acid and water, over hydrocarbons.

32. The polymeric membrane of claim 31 wherein said polymeric layer is made of a polymerized alcohol, an oxoanion modified polymerized alcohol, polymerized alcohol copolymers, oxoanion modified polymerized alcohol copolymers, and oxoanion modified polymerized terpolymers.

33. The polymeric membrane of claim 31 wherein said polymeric layer is made of a polymer selected from the group consisting of PVA, PVS, PVA phosphate, PVA arsenate, PVA selenate, PVA tellurate, PVA nitrate, and PVA borate.

34. The polymeric membrane of claim 31 wherein said polymeric layer is crosslinked to enhance its mechanical stability.

35. The polymeric membrane of claim 31 wherein said polymeric layer comprises PVA, PVS, polypropyl alcohol, polybutyl alcohol or a combination thereof.